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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,124	09/08/2003	Vito Lambertini	Q76661	8655

7590 07/28/2005

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EXAMINER

PADGETT, MARIANNE L

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 07/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/656,124

Applicant(s)

LAMBERTINI ET AL.

Examiner

Marianne L. Padgett

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9/8/03, 1/26/05 & 4/21/05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 16-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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1. Applicant's election without traverse of Group I method claims 1-15 in the reply filed on 4/21/2005 is acknowledged.
2. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Use of relative terms, with out clear metes and bounds in the claims, or without a clear definition in the specification or in relevant cited prior art, is vague and indefinite. In the independent claim 1, see "nanometric" or "micrometric" or "nanoparticle" (emphasis added), where scope encompassed by the use of the prefixes "nano-" or "micro-" is not clear, since it is known for use of indicate generically tiny sizes or the opposite of macro. Alternately, the units of nm or μm can be used to describe any size, but it is not known what overall range these terms are intended to encompass, i.e., for nanometric: 1-100 nm or 0.1 – 1000 nm or 10^{-2} - 10^4 nm or what? A like variety of ranges are potential for the nanoparticle or micrometric (but the latter with μm units). Review of the specification did not find any definitions of these terms, but there were examples, such as on p. 5 where micrometric may be approximately 50-500 μm , and nanometric is "approximately some 50 nm", but an example is not definition and it is unclear how far outside the specified range, the terms (generic) are intended to encompass.

The claim 1 preamble has an optional range for heights of projections on surfaces, that is "up to 500 micron", i.e., 0-500 μm , therefore includes flat or infinitely small, thus employed there is no limit to how small the nano- or micrometric structure may be. Also in the optional surface projections, it is uncertain what is meant by "arranged according to definite geometrics".

Use of “it” in line 3, is vague and indefinite as there are quite a few nouns preceding “it”, to which “it” might be referring. Assuming typical patent phrasing, it might be assumed/ guessed to mean the equivalent of --said method--, but clarity is needed.

In lines 5-6 of claim 1 “photopolymeric or UV mixture” is vague and indefinite because (1) it is uncertain if mixture only goes with UV (i.e. light in the range of 10.1 nm –400 nm) or also goes with “photopolymeric”, however phrasing implies but does not necessitate the latter); (2) while one may mix “nanoparticles” with UV light, the examine notes that forming a layer of a mixture of such light and nanoparticles is highly improbable, hence it appears the a critical defining phase or word has been left out. Unfortunately, the same language appears to have been used through out the specification, hence not providing necessary clarification of meaning.

While context and discussion of “the polymerization” in line 7 might suggest the --UV curable polymeric mixture-- were intended as the alternative, this is NOT what is claimed, but the light it self as a mixture, and changing it will require clear showing of support or inherency in the original specification. (3) Since the preamble makes use of surfaces for projections optional, it is unclear what effects this has on the claimed substrate. (4) In line 6, of claim 1, “a respective substrate” has unclear meaning, i.e., “respective” to what?

In lines 7-8, “the polymerization” lacks proper antecedent basis, as none is required to occur until the last line of the claim. While it is noted that order of listing does not necessitate order of doing unless required by temporal or antecedent language, it is improper to indicate antecedence for a limitation not yet claimed, as it can cause confusion. Also in what or where are there “variation of the index of refraction” that are used to control the polymerization?

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In lines 9-11, “capable of” is not a positive recitation of a step, only an ability that need not necessarily be applied, and “...in order to induce the growth of surface projections” finds its antecedence in the optional limitation of the preamble, so it is unclear if any projections are actually being claimed to be induced by application of magnetic and/or electric fields.

Also note the discrepancy in line 5 “photopolymeric” is generic to all light or any light, but the “exposure” step only claims UV, which need not cure the photopolymeric [mixture].

In claim 3, “inert” in “inert environment” is an undefined relative term, since what it is inert to is not specified, and the secondary range of “i.e., without oxygen” is a narrower optional range as claimed.

Claim 4 is ambiguous or it is unclear if it is positively claimed, since it is not clear if any projections “must be made” due to problems in claim 1 discussed above. In claim 5, what is necessitated by a “binary mask”?

In claim 6 “the polymeric lattice” lacks any antecedent basis, such that it is unclear how it relates to the limitations of claim 1 from which claim 6 depends.

Claim 7 makes no sense to the examiner. “The control of the variation of the refractive index of the layer” lacks any antecedence because no such control was claimed, but instead control of polymerization by means of variation, which is a totally different limitation. Also, claim 1 applies the magnetic and/or electric field, so it is unclear how differential curing will have any necessary effect on either of these applied fields, especially since no positioning or orientation of the orientable nanoparticles has necessarily occurred. This claim as written does not appear to be clear enough for meaningful further examination over the prior art.

The verb “envisage” means “to view or regard in a certain way” or “to have a mental picture of, esp. in advance of realization” and is synonymous with “think” (Webster’s), hence to envisage a step is only to think about it and does not require it to ever be preformed, i.e. none of claims 7-10 and 13, which are “envisaged” or dependent on limitation that are envisaged, contain positively claimed steps.

In claim 8 the “(M)” after “the layer” is of unclear meaning, since “a layer” introduced in claim 1 has no such modifier or descriptive symbol or whatever. Also the double range in claim 8 is noted, where the second narrower one is considered to be optional.

In claim 9, “a number of axes” of what? Also note that “positionable” is also not a positive limitation, as it does not require any positioning to occur, only the capability.

In claim 13, the location of the tip, UV beam focus and the previously formed projection, is a bit ambiguous as according to claim 9 from which 13 depends, the tip is positionable, i.e., movable, and where it is not specified; previously formed projection(s) does not necessitate leaving it in place; and how does having the tip in proximity of the UV beams focus, so probably blocking the light, enable cross-linking?

In claim, line 1 “which the is of” is clearly missing a noun after “the”, where what it is, might be guessed to be “layer”, but is no necessarily so.

In claim 15, what is “ferrofluids”? The term is noted to be used on p. 4, line 13, but not defined.

3. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required.

See MPEP §§ 602.01 and 602.02.

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The oath or declaration is defective because: It does not identify the citizenship of each inventor. See the last signing inventor, Piero Perlo.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-3, 11 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsieh et al (6,818,155 B2).

Note that a subrange is optional and need not be disclosed for a claims to be anticipated by the broader claimed range when double ranges are claimed, and undefined relative terms may also be read on by any disclosures within possible interpretations of their meaning.

Hsieh et al (155) teach depositing a mixture of curable polymer and magnetic particles that may be ferro-magnetic metals or ferro-electric materials, where they are small in size and acicular shaped with an exemplary approximate dimension of (1x2x10) μm , with other dimensions taught within the scope of the invention. Taught particles of such size would be considered to be 'fluid'. The polymer may be cured by UV radiation or other radiation sources and the magnetic particles may be aligned when curing takes place or before. See the abstract; Figure, esp. 4 & 6; col.2, lines 3-17 & 47 – col. 3, line 34+; col. 4, lines 17-67; col.6, lines 50-65). Note that as no gaseous reactions are taught to occur during photopolymerization, the environment may be considered inert within the scope of the broad limitation.

6. Claims 1, 3, 11 and 14-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Martin et al (6,391,393 B1).

Martin et al teach creating "field-structured materials" with aggregates of magnetic particles, where magnetic or electrical fields may be selectively applied to a magnetic particle/polymeric composite to cause "significant texturing", then the polymer may be photo- or UV-cured. Ferrofluids of SiO and 12.0 nm size are mentioned, as is 3-5 μm carbonyl iron powder. Suggested photocurable polymers included urethane acrylate-base photopolymers. Martin et al also discusses curing done in stages, first gelling with magnetic field application, then full curing, but this example discusses a thermal curing process with an epoxy.

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In Martin et al, see fig. 1; col. 1, lines 10-67; col. 2, line 55-col. 3, line 40, esp. 20-35; col. 4, lines 23-63; and col. 6, lines 24-42.

7. Claims 2, 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al, in view of Hsieh et al.

Martin does not photocure simultaneously or pre-polymerize with UV, however Hsieh et al who was seen above as performing an analogous process, shows that simultaneously positioning and curing with UV are effective, hence depending on viscosity and curing speed, of particular polymer mixture, such curing procedure would have been obvious to employ in Martin for its expected effectiveness and saving of a separate step. Also, as Martin provides a thermally cured staged example suggesting gelling the polymer partly before finally fully curing, it would have been obvious, especially considering Hsieh et al's UV curing teachings, to employ similar staged curing with ultraviolet light, as there would have been an expectation that curing would be finished sooner, and still successfully.

The teachings in Martin of applying localized magnetic or electric fields for positioning the particles, does not provide a teaching of the means to so apply it, but expect one of ordinary skill to know common means for such application. As such fields typical are produced from finite structures, to localize them one would have obviously been expected to employ structures with shapes corresponding by having similar configurations to the regions where the field(s) were/are desired to be localized, or the ability to trace such regions while applying the field, hence structures with tips would have been obvious with use of material capable of providing the taught and required fields, with the appropriate electrical connecting materials as appropriate.

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8. JP -61-198,428 A to Hoshi et al is of interest, teaching an example of partial curing with UV while applying a magnetic field to orient, then completing the cure afterwards.

9. Claims 4-7 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al, in view of Hsieh et al as applied to claims 1-3, 8-11 and 14-15 as appropriate above, and further in view of McArdle et al (6,180,226 B1).

Martin et al, alone or as combined with Hsieh et al, do not discussed localized curing or masking to do so, however McArdle et al, who also is positioning ferrofluid particles in UV curable polymers in order to make arrays and patterns therewith, such as for interconnects for the electronic industry, discusses the possibility of making multiple separate particle patterns on the same surface, where one alternative is orient one area of particles and mask while curing /polymerizing, then subsequently treat and cure the previously masked area (abstract; col. 1, lines 5-19; col. 3, lines 10-12; col. 5, lines 22-45; col. 15, lines 61-64; col. 17, lines 5-50, esp. 16-20; col. 18, lines 50-col. 19, lines 45⁺). It would have been obvious to one of ordinary skill in the art, that the ability to effect multiple patterns of field structuring in Martin et al's process would have been desirable for the advantage of the versatility it gives in producing a useful products, hence application of conventional masking techniques to accomplish such would have been expected to be effective as McArdle et al has shown that masking is effective with analogous materials and proceedings, as would have been other conventional light patterning techniques, such as direct writing with focused light beams or lasers.

10. Claims 1-3, 8, 11 and 14-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Kostenmaki et al (5,522,962).

Kostenmaki et al teach using a carrier substrate (web) with recesses in one face, providing ferromagnetic particle typically coated in a slurry of particles and binders, which is treated in a magnetic field to form conductive columns, with the binder cured to trap them in place. While most examples are between 2 webs, use of a single substrate to form upright projections as illustrated in Fig 6 is also taught. The binder material may be oligomers of (meth)acrylates, particles typically 5-50 μm may be used, and an exemplary curing technique employs UV and magnetic fields to simultaneously treat a continuously moving substrate, which is additionally cured with UV thereafter. See the abstract; Fig. 6; col. 2, lines 58-col. 3, lines 7; col. 6, lines 33-40; col. 7, lines 42-51; col. 8, lines 1-19, 38-42 & 65-col. 9, lines 20 & 60-65; and claims.

11. Phillips et al (6,808,806 B2) is equivalent to McArdle applied above in section 9 for showing patterned (masked) orientation and curing in composite films of magnetic particles (Fig. 14, 15, etc).

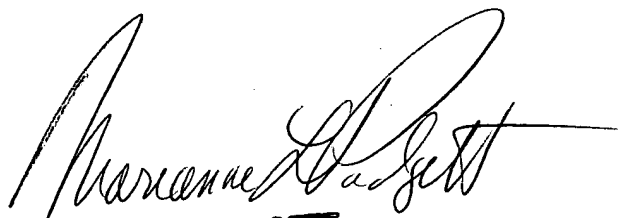
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on Monday-Friday from about 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M. L. Padgett/af
July 13, 2005
July 27, 2005



MARIANNE PADGETT
PRIMARY EXAMINER